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What is claimed is:

- A method of inhibiting rejection of a solid organ transplant in a subject having a transplanted tissue comprising:
- 5 a) administering an alkylating agent to the subject; and
 - b) subsequently administering T cell depleted bone marrow cells to the subject at approximately the same time as the solid organ transplant, thereby inhibiting rejection of the solid organ or tissue/cellular transplant.
- 10 2. The method of claim 1, wherein the alkylating agent is busulfan.
 - 3. The method of claim 1 further comprising the step of administering to the subject an immunosuppressive composition that blocks T cell costimulatory signals in the subject.
 - 4. The method of claim 3, wherein the immunosuppressive composition comprises a combination of a first ligand that interferes with binding of CD28 to either CD80 or CD86, and a second ligand that interferes with binding of CD154 to CD40.
- 20 5. The method of claim 4, wherein the first ligand is a soluble CTLA4 molecule.
 - 6. The method of claim 4, wherein the first ligand is CTLA4-Ig.
 - 7. The method of claim 4, wherein the second ligand is an anti-CD154 mAb.
 - 8. The method of claim 4, wherein the first ligand is a soluble CTLA4 molecule and the second ligand is an anti-CD154 mAb.
 - 9. A method for establishing mixed hematopoietic chimerism in a subject having a transplanted tissue comprising:
 - a) administering T cell depleted bone marrow cells to the subject;
 - b) administering an alkylating agent to the subject; and



- c) administering an immunosuppressive composition that blocks T cell costimulatory signals in the subject, thereby establishing hematopoietic chimerism in the subject.
- 5 10. The method of claim 9, wherein the alkylating agent is busulfan.
 - 11. The method of claim 9, wherein the immunosuppressive composition comprises a combination of a first ligand that interferes with binding of CD28 to either CD80 or CD86, and a second ligand that interferes with binding of CD154 to CD40.
 - 12. The method of claim 11, wherein the first ligand is a soluble CTLA4 molecule.
 - 13. The method of claim 11, wherein the first ligand is CTLA4-Ig.

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- 15 14. The method of claim 11, wherein the second ligand is an anti-CD154 mAb.
 - 15. The method of claim 11, wherein the first ligand is a soluble CTLA4 molecule and the second ligand is an anti-CD154 mAb.
- 20 16. The method of claim 9, wherein the method inhibits rejection of an organ or tissue transplanted into the subject.
 - 17. The method of claim 9, wherein the T cell depleted bone marrow is administered in at least two doses.
 - 18. A method for establishing mixed hematopoietic chimerism in a subject having a transplanted tissue comprising:
 - a) administering T cell depleted bone marrow cells to the subject;
 - b) administering an immunosuppressive composition that blocks T cell costimulatory signals in the subject; and
 - c) administering busulfan to the subject,



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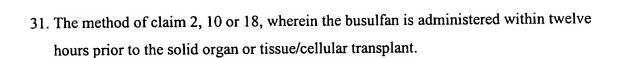
thereby establishing mixed hematopoitic chimerism in the subject.

- 19. The method of claim 18, wherein the immunosuppressive composition comprises a combination of a first ligand that interferes with binding of CD28 to either CD80 or CD86, and a second ligand that interferes with binding of CD154 to CD40.
- 20. The method of claim 19, wherein the first ligand is a soluble CTLA4 molecule.
- 21. The method of claim 19, wherein the first ligand is CTLA4-Ig.
- 22. The method of claim 19, wherein the second ligand is an anti-CD154 mAb.
- 23. The method of claim 19, wherein the first ligand is a soluble CTLA4 molecule and the second ligand is an anti-CD154 mAb.
- 24. A method for treating hemoglobinopathy in a subject by establishing hematopoietic chimerism by the method of claim 9, or 18.
- 25. The method of claim 24, wherein hemoglobinopathy is beta-thalassemia.
- 26. The method of claim 24, wherein the hemoglobinopathy is sickle cell disease.
- 27. The method of claim 1, 9, or 18, wherein the transplanted tissue is a solid organ or tissue/cellular transplant.
- 28. The method of claim 9 or 18, wherein steps (b) and (c) are concurrent.
- 29. The method of claim 9 or 18, wherein steps (b) and (c) are subsequent to step (a).
- 30 30. The method of claim 2, 10 or 18, wherein the busulfan is admitnistered within one day prior to the solid organ or tissue/cellular transplant.

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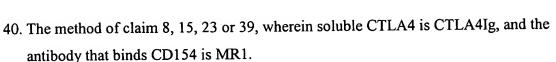


- 5 32. The method of claim 2, 10 or 18, wherein the busulfan is administered within six hours prior to the solid organ or tissue/cellular transplant.
 - 33. The method of claim 1, 9, or 18, wherein the transplanted tissue is a skin graft.
- 34. A method of reducing rejection of an organ transplant in a subject in need thereof comprising:
 - a) administering a first dose of T cell depleted bone marrow cells and an immunosuppressive composition to a subject;
 - b) placement of an organ or tissue/cellular transplant to the subject;
 - c) administering busulfan to the subject; and
 - d) administering a second dose of T cell depleted bone marrow cells and an immunosuppressive agent, thereby reducing rejection of the organ or tissue/cellular transplant.
- 35. The method of claim 34, wherein the immunosuppressive agent is a combination of a first ligand that interferes with binding of CD28 to either CD80 or CD86, and a second ligand that interferes with binding of CD154 to CD40.
 - 36. The method of claim 35, wherein the first ligand is a soluble CTLA4 molecule.
 - 37. The method of claim 35, wherein the first ligand is CTLA4-Ig.
 - 38. The method of claim 35, wherein the second ligand is an anti-CD154 mAb.
- 39. The method of claim 35, wherein the first ligand is a soluble CTLA4 molecule and the second ligand is an anti-CD154 mAb.

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- 41. The method of claim 8, 15, 23 or 39, wherein soluble CTLA4 is CTLA4Ig, and the antibody that binds CD154 is selected from a group consisting of ATCC HB11809, HB 11815, HB11816, HB 11817, HB 11819 HB 11821, and HB 11822.
 - 42. A method of inhibiting rejection of a solid organ transplant in a subject having a transplanted tissue comprising
- a) administering T cell depleted bone marrow cells; 10
 - b) administering busulfan to the subject; and
 - c) administering CTLA4Ig and a monoclonal antibody MR1 to the subject, thereby inhibiting rejection of the solid organ or tissue/cellular transplant.
- 43. A method of inhibiting rejection of a solid organ transplant in a subject having a transplanted tissue comprising
 - a) administering T cell depleted bone marrow cells;
 - b) administering busulfan to the subject; and
 - c) administering CTLA4Ig and a monoclonal antibody consisting of ATCC
 - HB11809, HB 11815, HB11816, HB 11817, HB 11819 HB 11821, and HB 11822, to the subject,
 - thereby inhibiting rejection of the solid organ or tissue/cellular transplant.